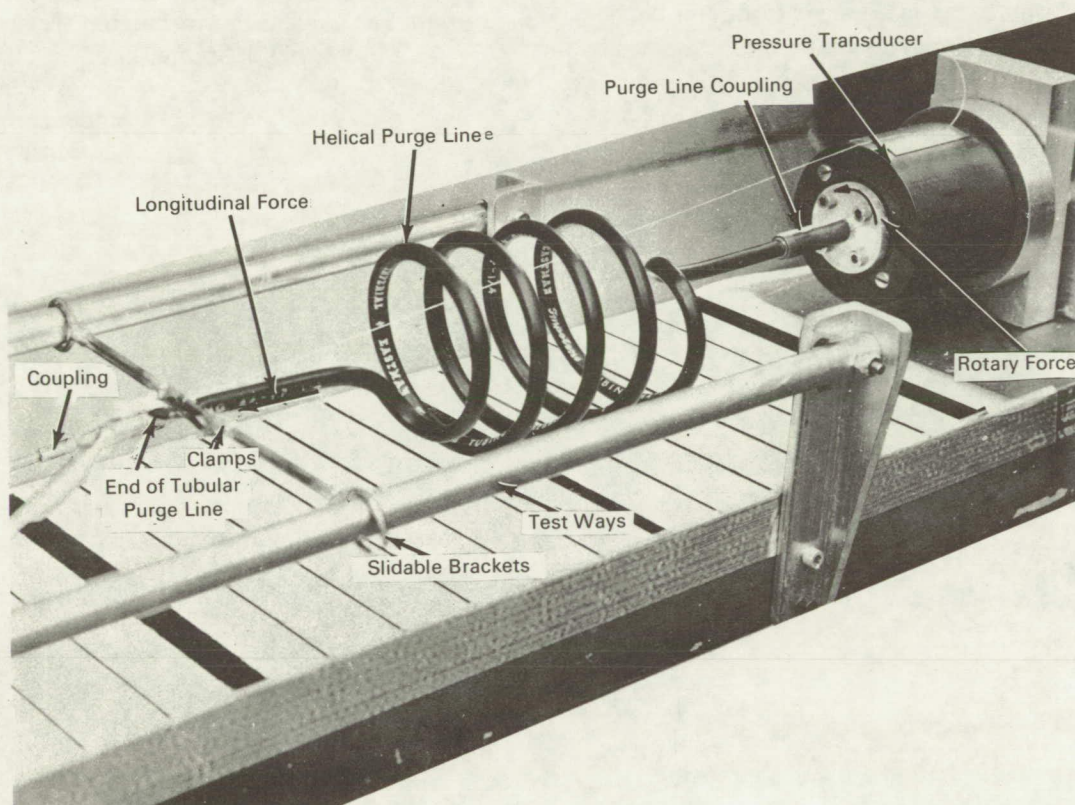


NASA TECH BRIEF



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Torsional Tubular Disconnect



The problem:

Devise a disconnect for a gas supply line with a circular interface that will reliably maintain connection until desired parting occurs at a remote location, such as under water, in space, or at a place where disconnection cannot be effected manually. Longitudinal forces at separation are required to be at a minimum.

The solution:

A torque driven disconnect is developed consisting of a helical plastic tube with a disconnect coupling on one end fitted for an interference condition slip joint, and a rotationally constrained support on the other end connected to a gas source.

How it's done:

As shown in the picture of the test setup, a longitudinal force induces movement in the helical gas

(continued overleaf)

line such that a rotary and longitudinal force is exerted on the line coupling. This tubular line is placed on a test ways and mounted on slidable brackets by clamps such that the gas supply end of the helix cannot rotate. The force transducer measures the longitudinal component of the separation force. Pulling the spring-like, helical purge line imparts a twist to the end of the line attached to the disconnect.

In a typical application the twist force rotates the purge line coupled to the instrument. This action overcomes the static friction in a rotational mode and allows the coupling to be pulled off with a smaller longitudinal force as compared to that required by a straight nonrotating pull. That is, the separation force applied to the instrument when the disconnect action takes place is significantly reduced. The helical line also tends to isolate the instrument from vibrational inputs from associated apparatus.

Notes:

1. This invention can be used to separate conventional threaded devices. Industrial applications requiring a disconnect device can use the method of disconnect thread-held connectors and interference

fit disconnects provided by the invention. This may include such devices as safety hoses used to disconnect storage containers in gas processing. Designers and manufacturers of couplers and hoses will be interested in this invention.

2. Documentation is available from:

Clearinghouse for Federal Scientific
and Technical Information
Springfield, Virginia 22151
Price \$3.00
Reference: TSP69-10499

Patent status:

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